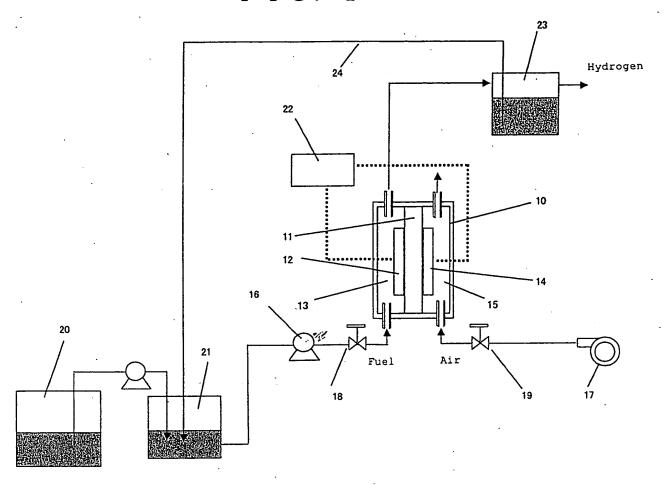
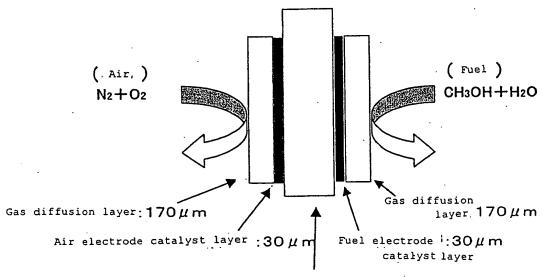
PCT/JP2004/0/9665 KPO-001

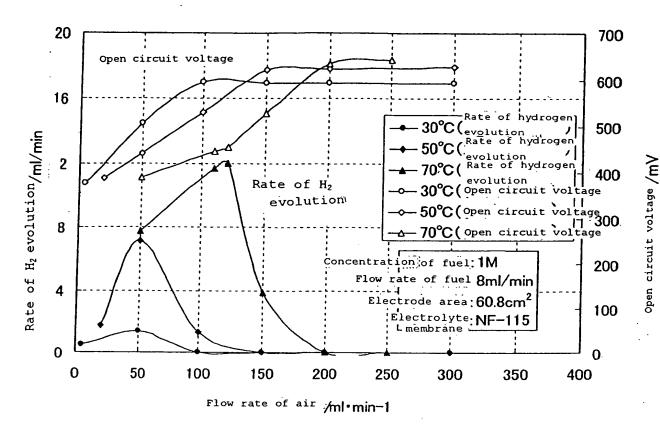
F I G. 1



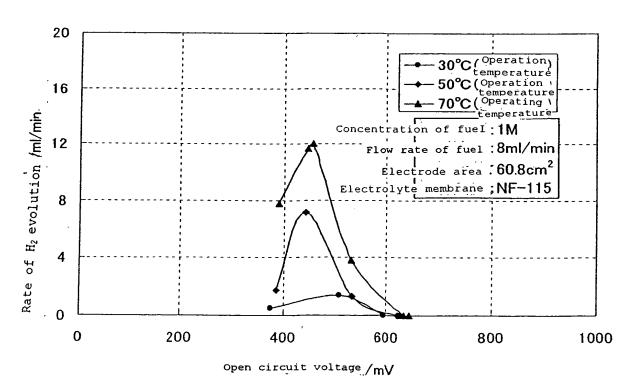
F I G. 2

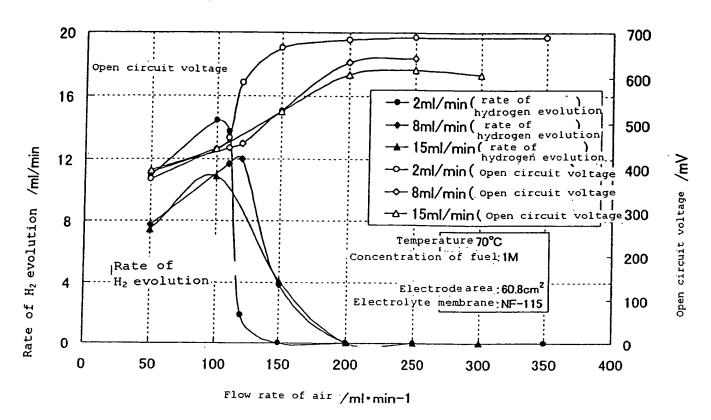


Electrolyte membrane (Nafion 115)

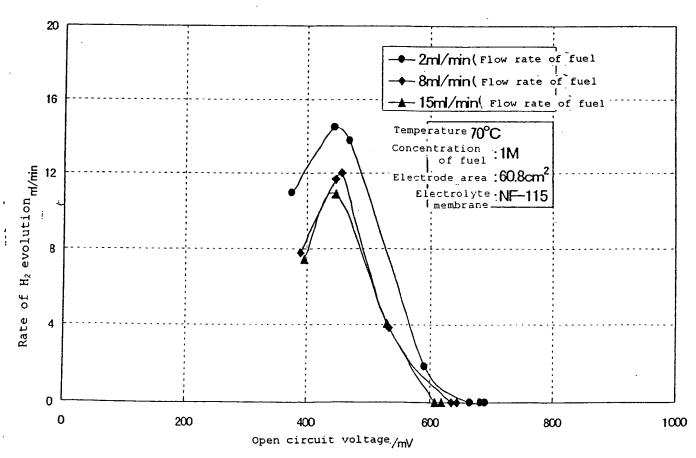


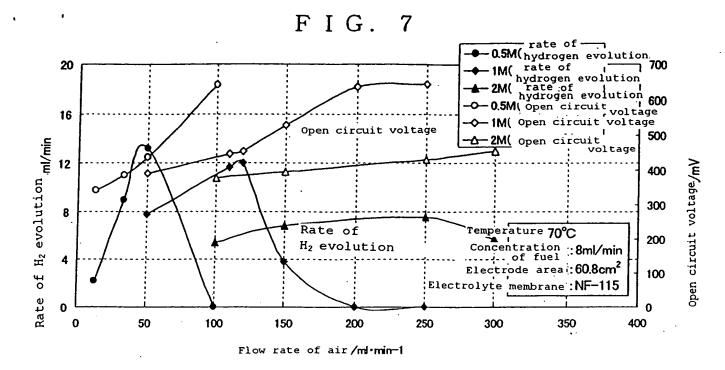
F I G. 4





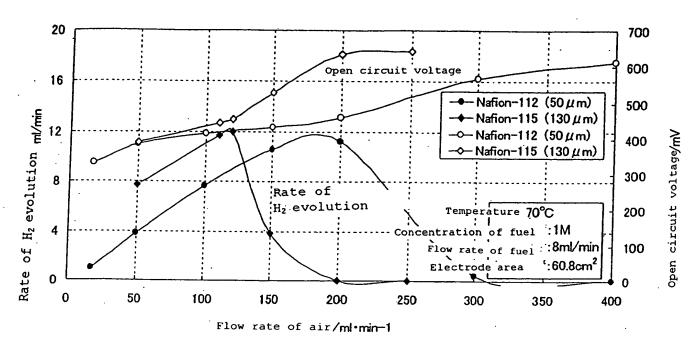
F I G. 6



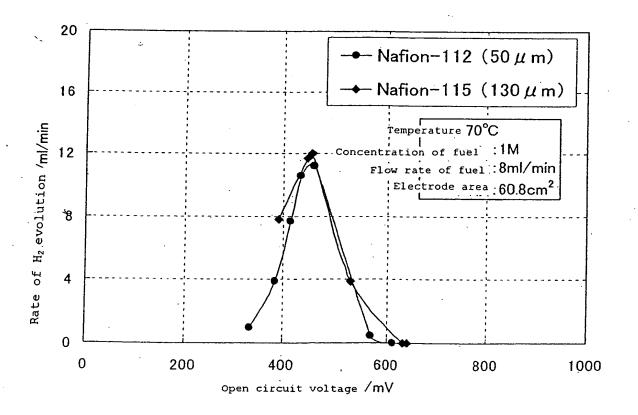


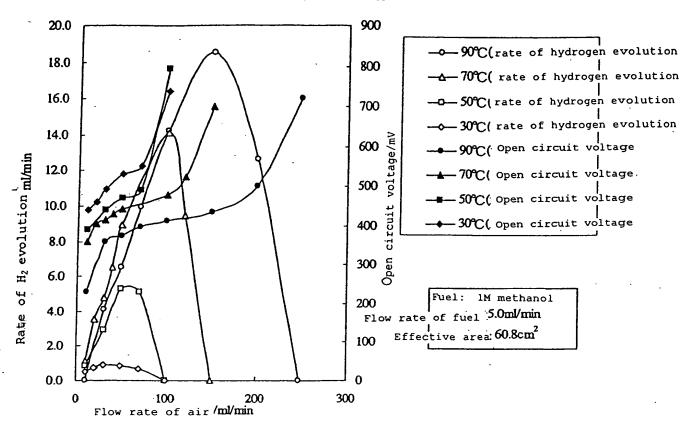
F I G. 8 20 -0.5M(Concentration of fuel -1M(Concentration of fuel - 2M (Concentration of fuel 16 Temperature: 70°C Rate of H₂ evolution /ml/min Flow rate of fuel 8ml/min 12 Electrode area: 60.8cm² Electrolyte membrane :NF-115 8 4 0 800 1000 0 200 400 600 Open circuit voltage /mV

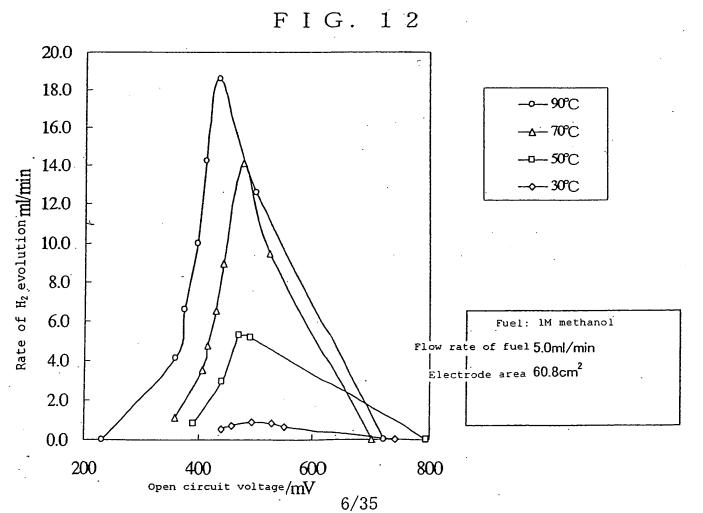
F I G. 9

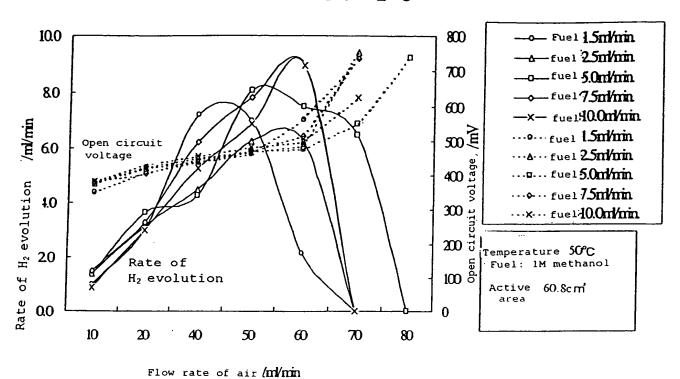


F I G. 10

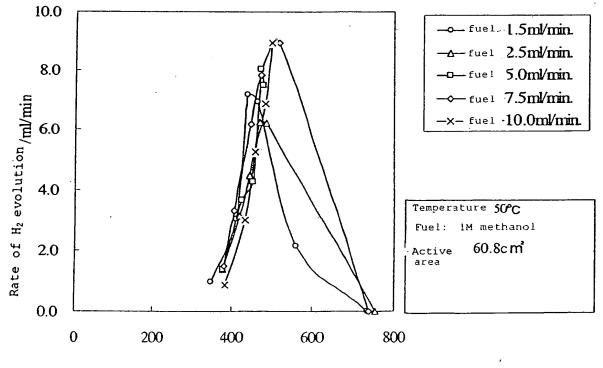




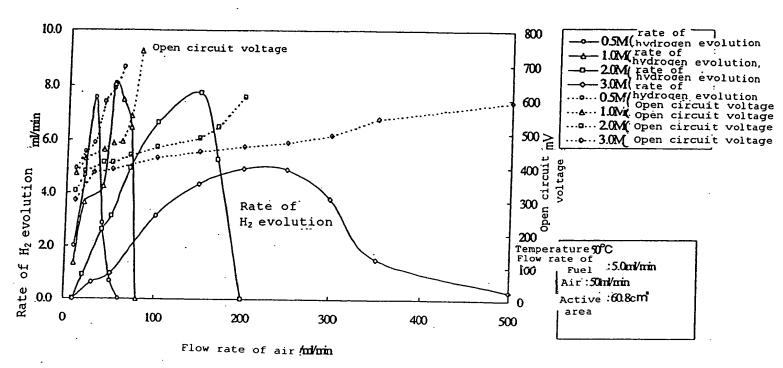


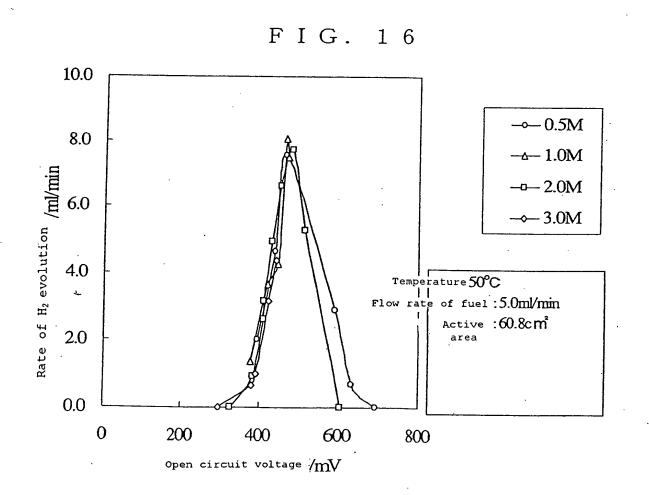


F I G. 14

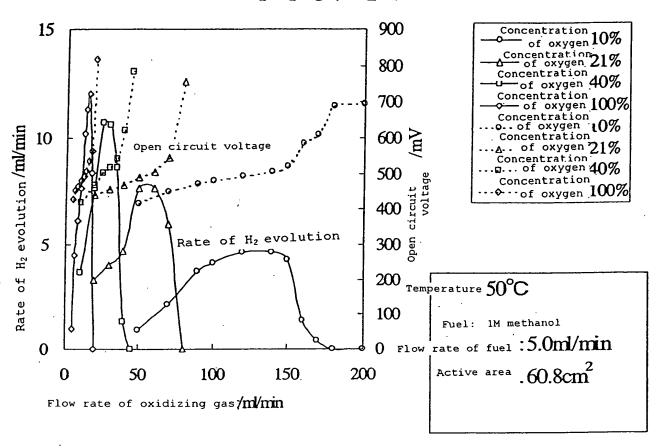


Open circuit voltage /mV





F I G. 17



F I G. 18

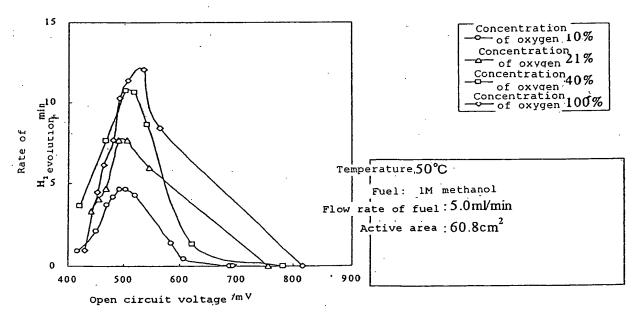
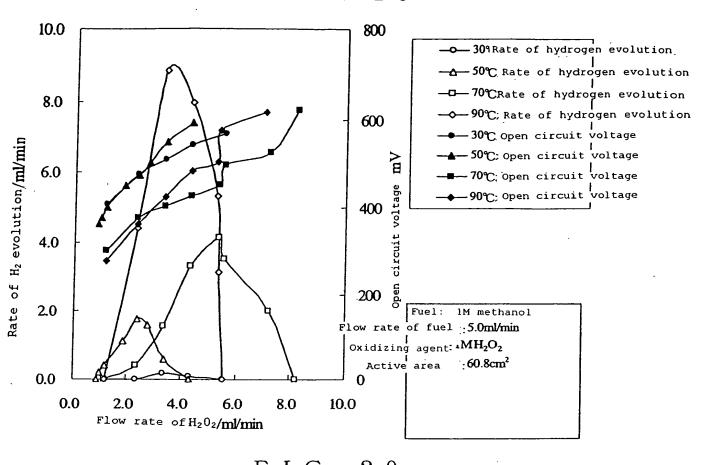
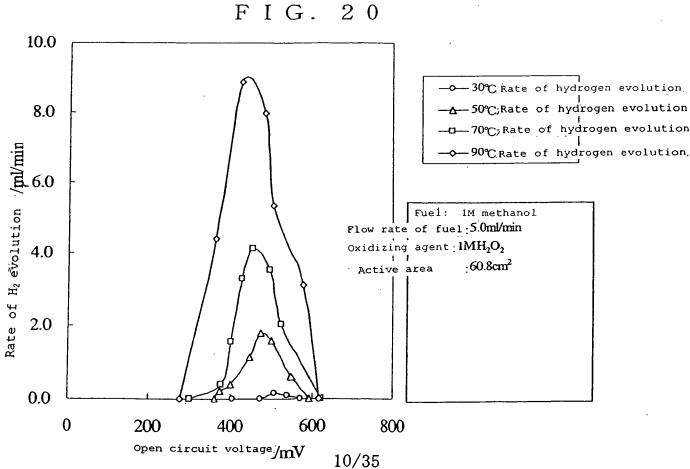
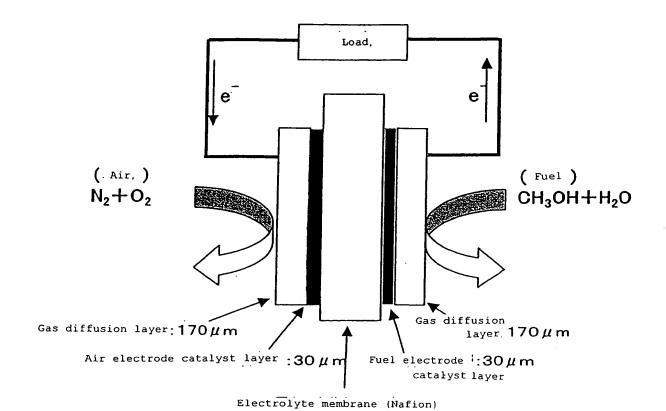


FIG. 19

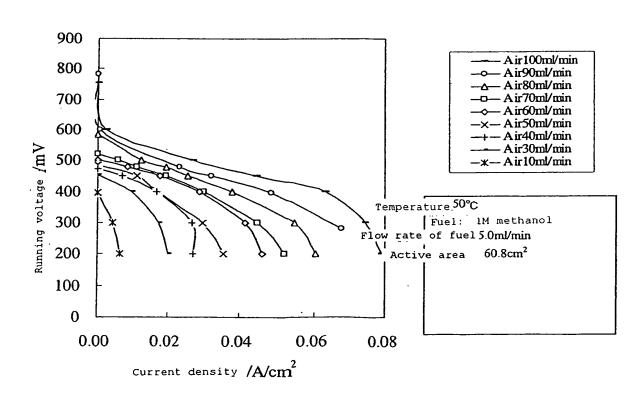




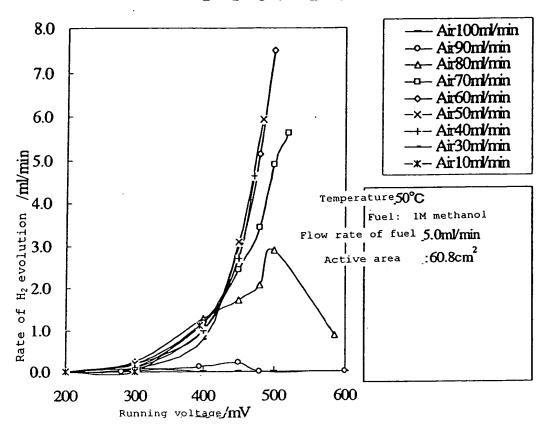
F I G. 21



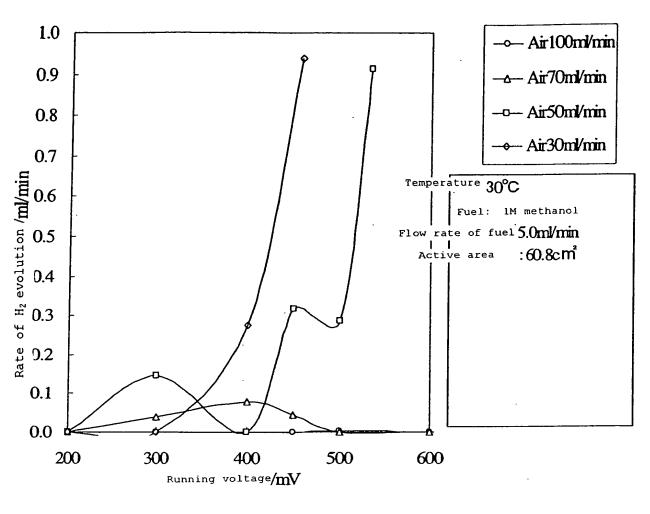
F I G. 22

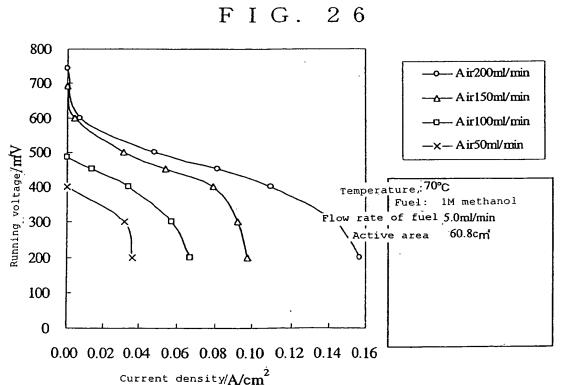


F I G. 23

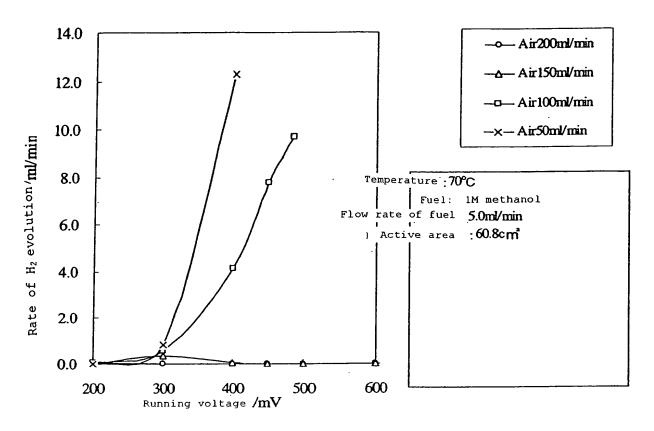


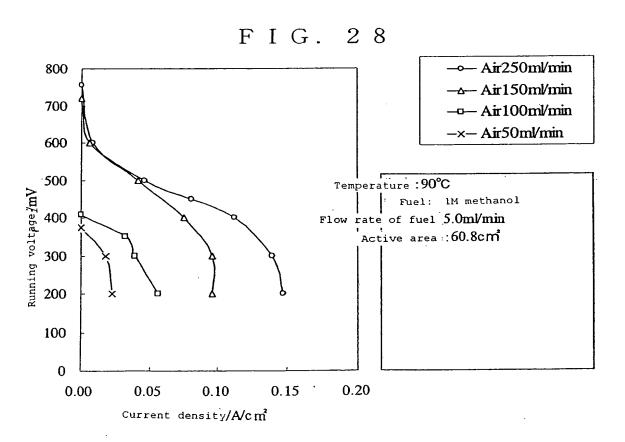
F I G. 24 800 - Air100ml/min 700 - Air70ml/min – Air50ml/min 600 - Air30ml/min Running voltaße/mV 500 400 Temperature 30°C Fuel: 1M methanol 300 Flow rate of fuel 5.0ml/min Active area :60.8cm 200 100 0 0.00 0.02 0.04 0.06 0.08 0.10 Current density/A/cm2



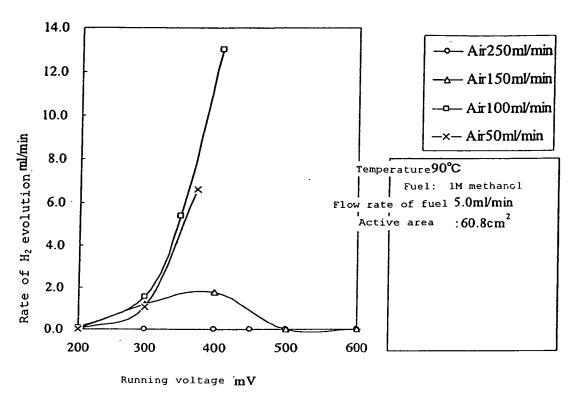


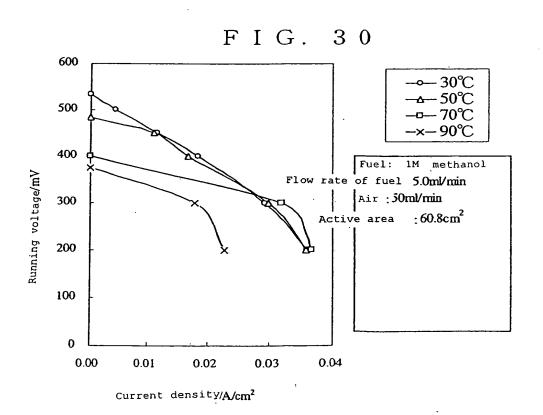
F I G. 27



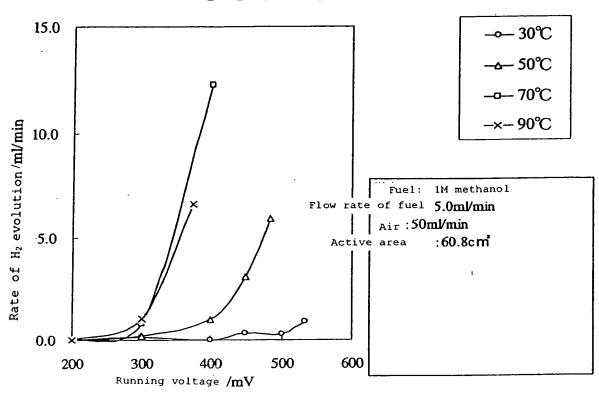


F I G. 29

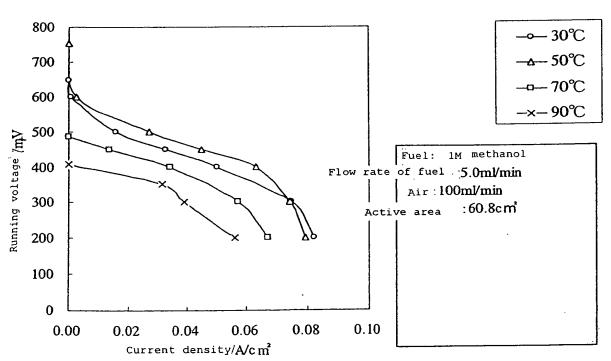




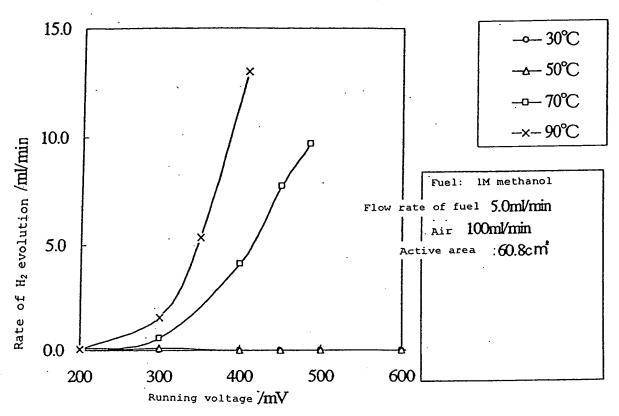
F I G. 31

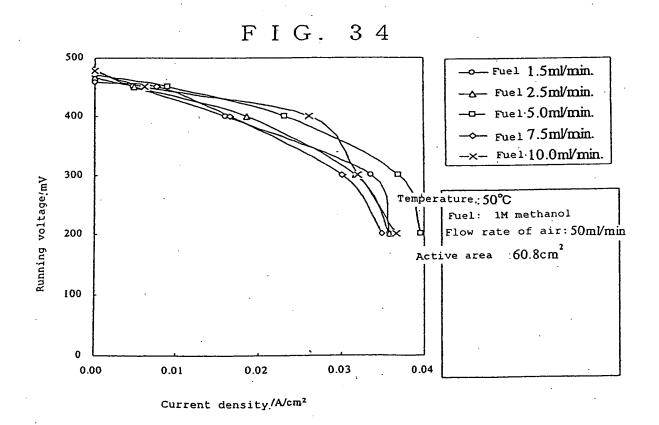


F I G. 32

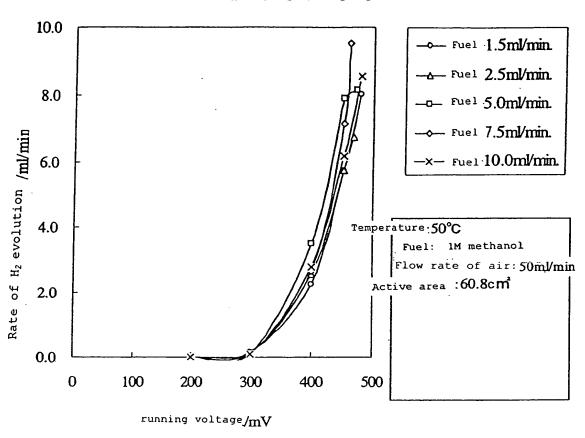


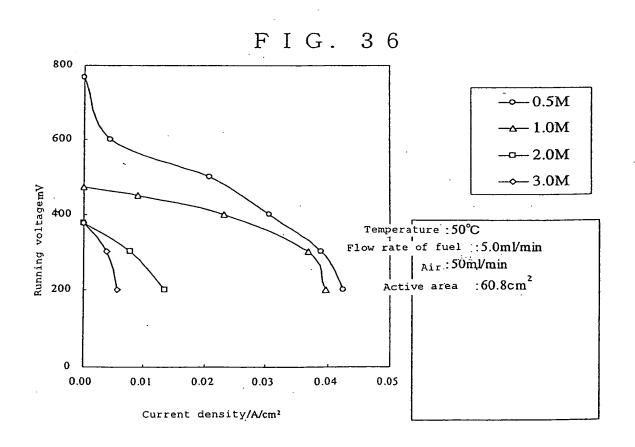
F I G. 33



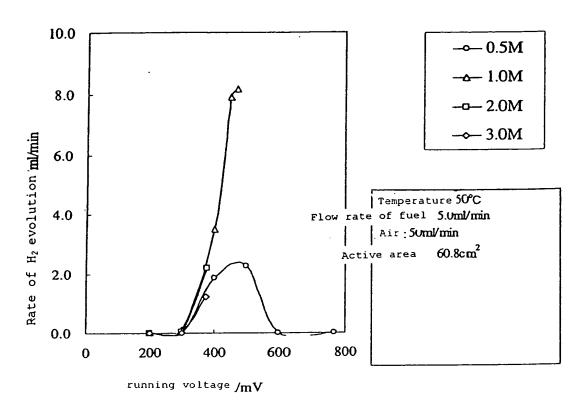


F I G. 35

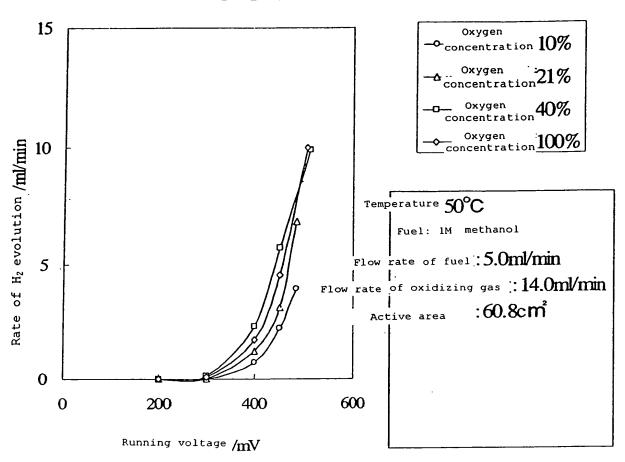




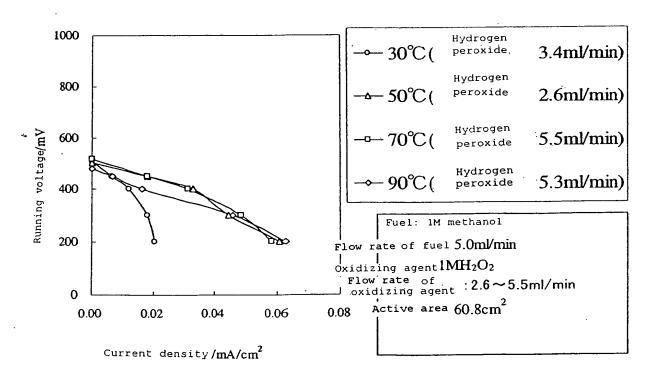
F I G. 37



F I G. 38 600 Oxygen concentration 10%Oxygen concentration21% Oxygen concentration10%Oxygen concentration 100% 400 Running voltage $I_{\mathbf{m}}V$ Temperature 50°C Fuel: 1M methanol Flow rate of fuel: 5.0ml/min Flow rate of oxidizing gas 200 14.0ml/min : 60.8cm² Active area 0 0.00 0.02 0.06 0.04 Current density/A/cm²



F I G. 40



F I G. 41

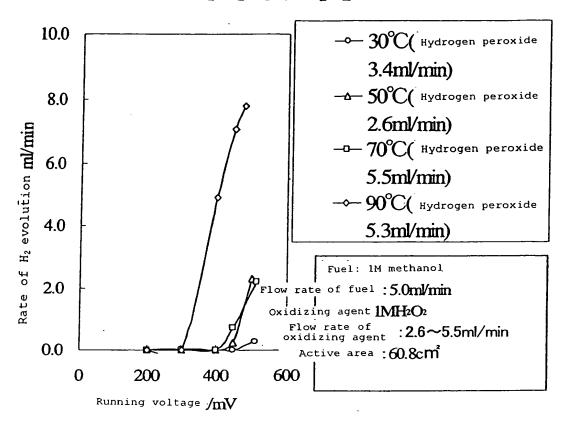


FIG. 42

DC source

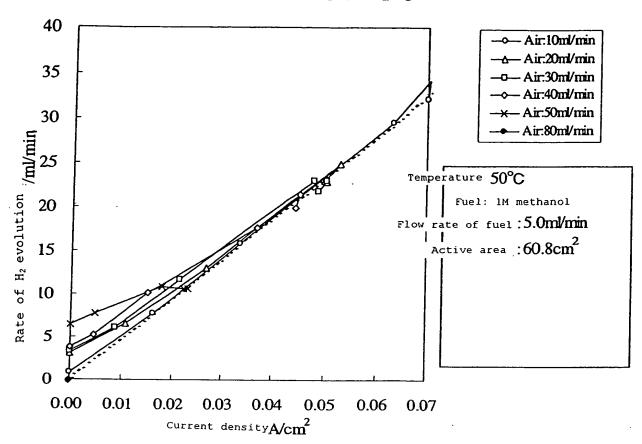
(Fuel.) $N_2 + O_2$ Gas diffusion layer $170\,\mu$ m

Air electrode catalyst layer: $30\,\mu$ m

Catalyst layer

Electrolyte membrane (Nafion)

F I G. 43



F I G. 44

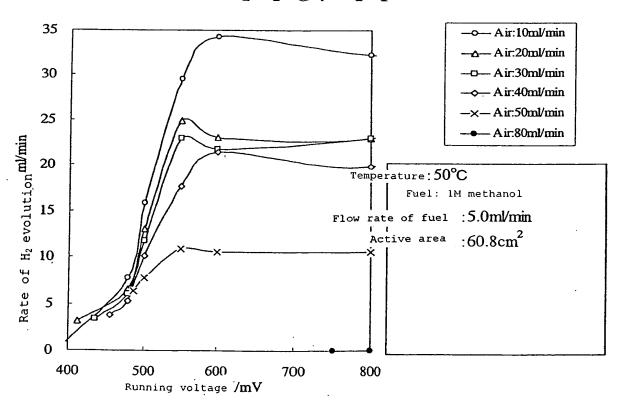
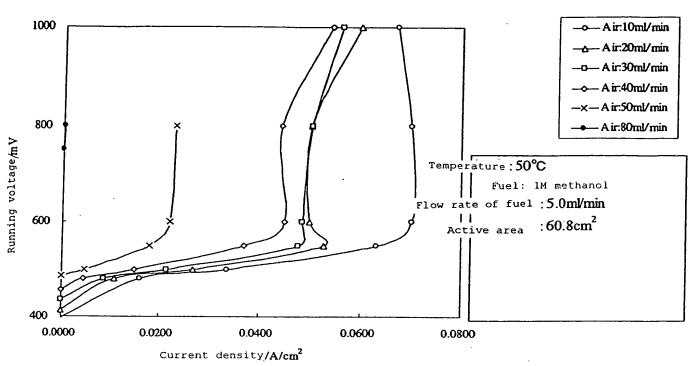
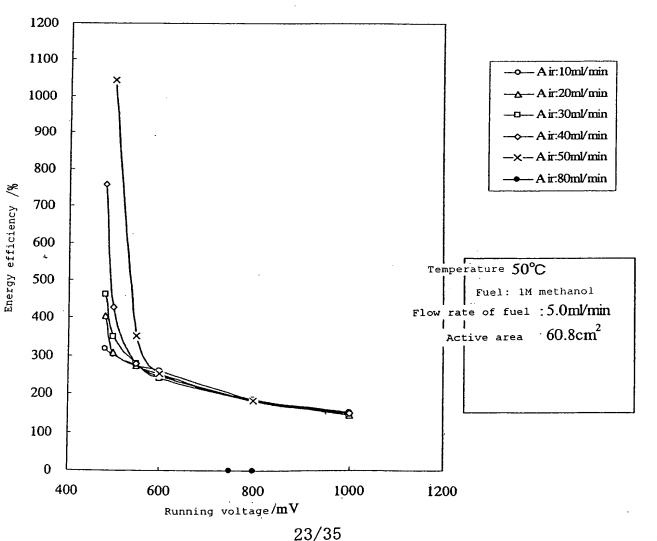
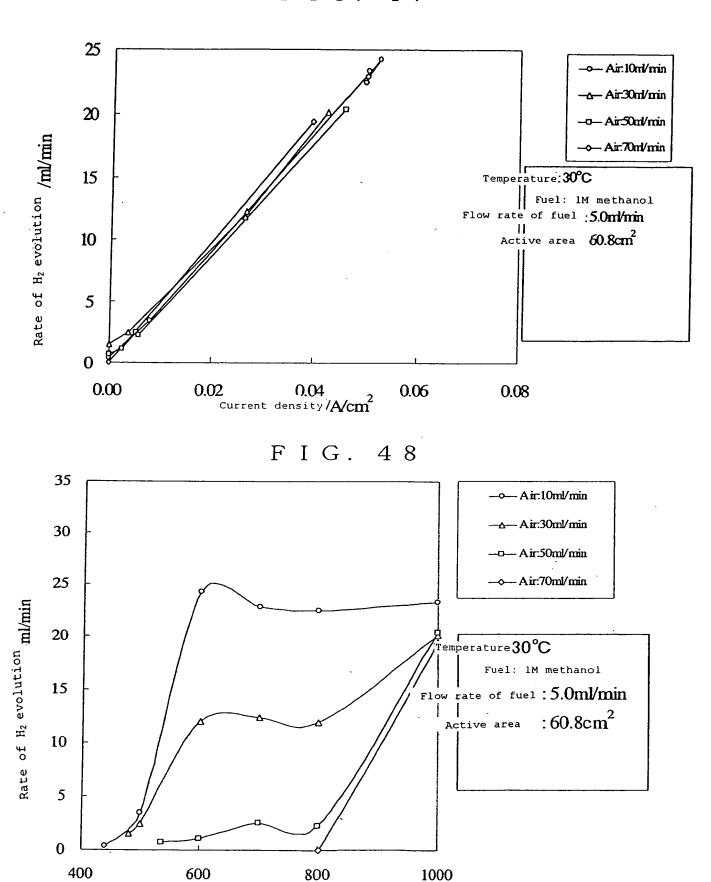


FIG. 45



F I G. 46

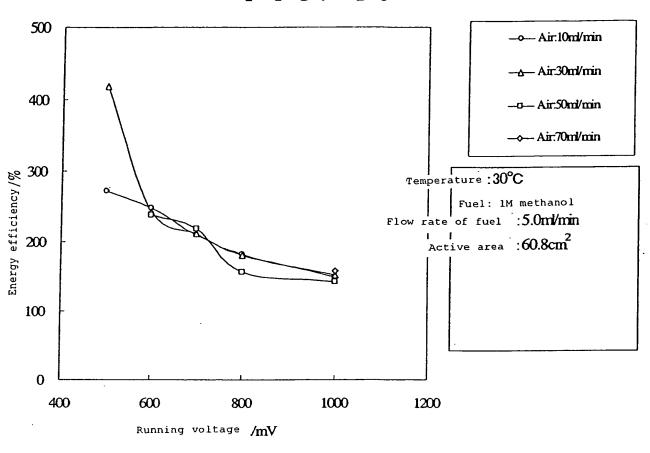




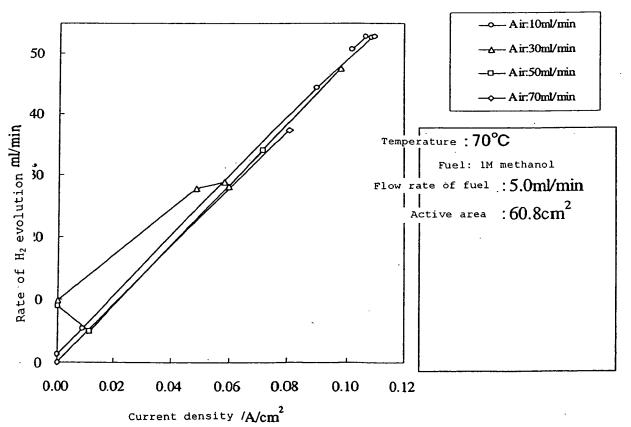
24/35

Running voltage $\mbox{/mV}$

FIG. 49

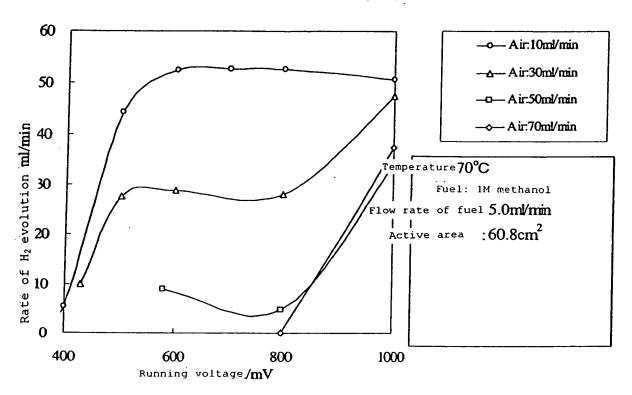


F I G. 50

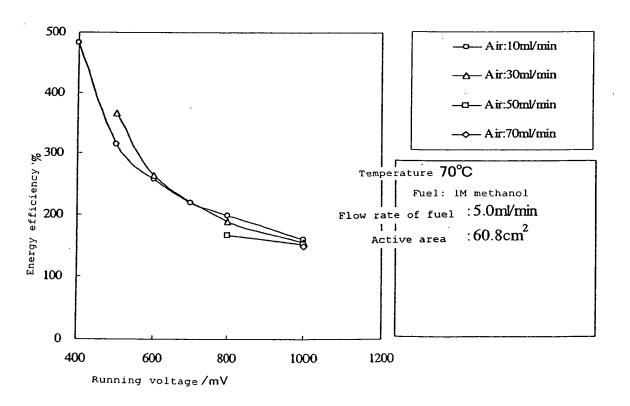


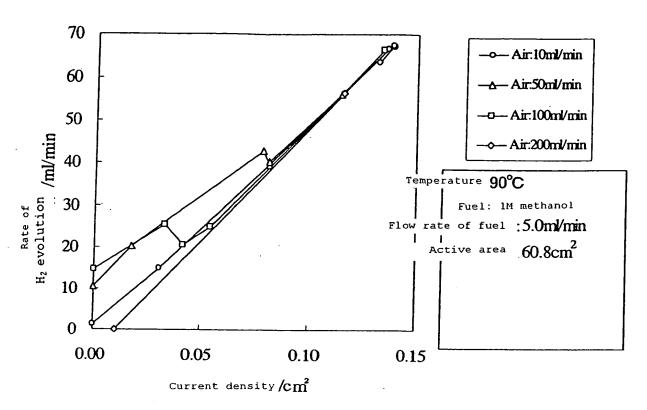
2 5 / 3 5

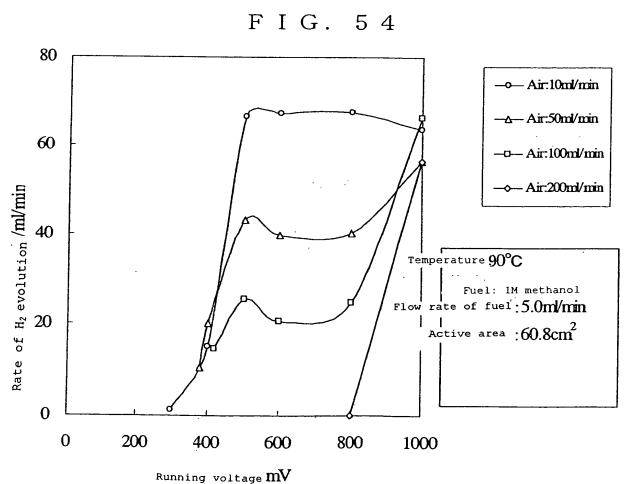
F I G. 51

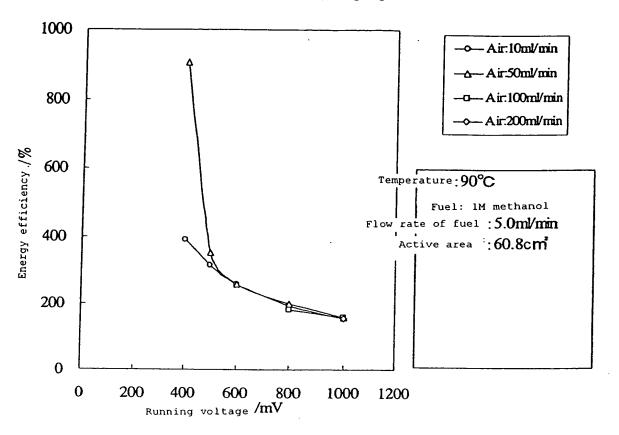


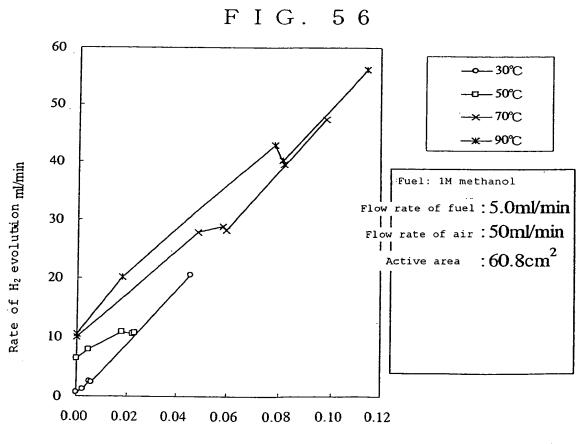
F I G. 52





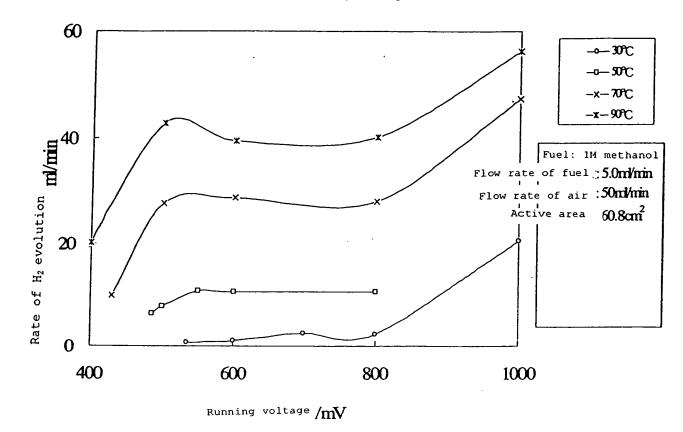






Current density $/A/cm^2$

F I G. 57



F I G. 58 1200 -o--- 30°C <u>ა</u>— 50°С 1000 -□--- 70°C ×-90℃ 800 Fuel: 1M methanol Energy efficiency 1% Flow rate of fuel :5.0ml/min 600° flow rate of air :50ml/min II. Active area :60.8cm² 400 200 0 400 600 800 1000 1200

Running voltage /mV

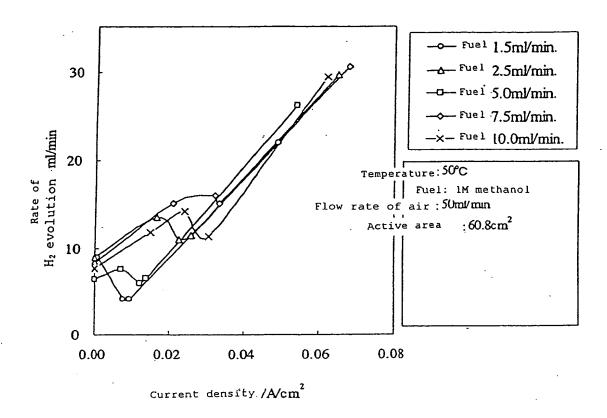
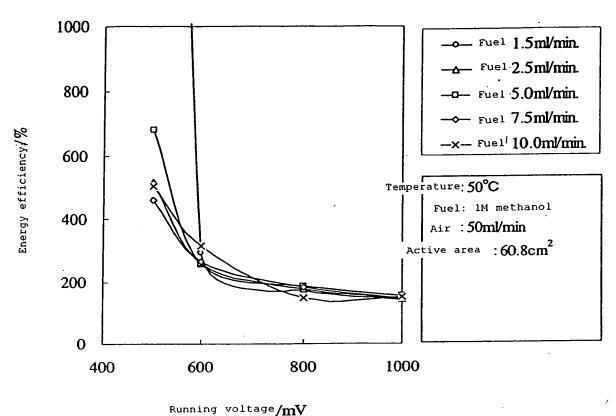
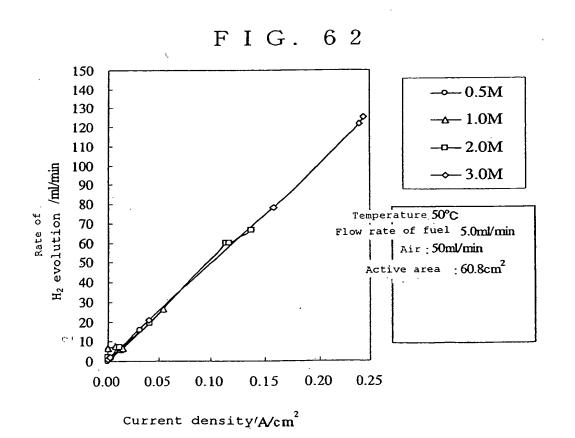


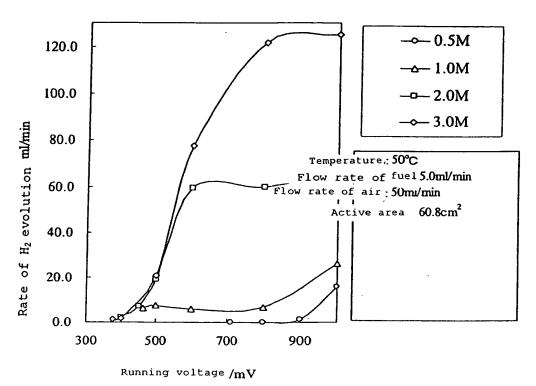
FIG. 6 0 - Fuel 1.5ml/min. _a_ Fuel 2.5ml/min. 30 - Fuel 5.0ml/min. - Fuel 7.5ml/min. -x- Fuel 10.0ml/min. H₂ evolution /ml/min Of Temperature 50°C Fuel: 1M methanol Flow rate of air: 50ml/min Rate of Active area :60.8cm² 0 400 800 1000 600 Running voltage /mV

F I G. 61

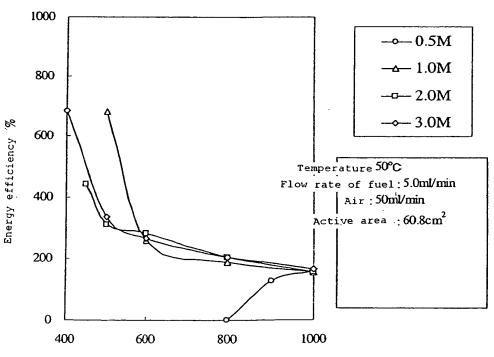




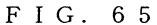
F I G. 63

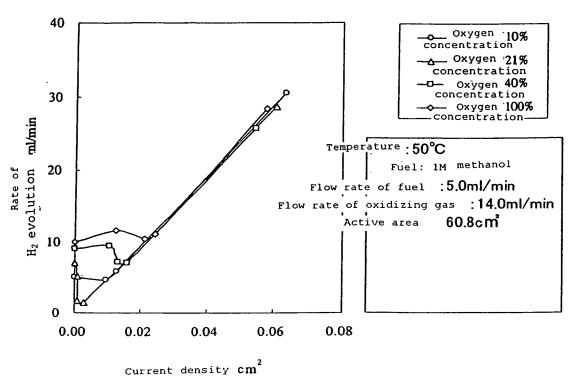


F I G. 64



Running voltage /mV





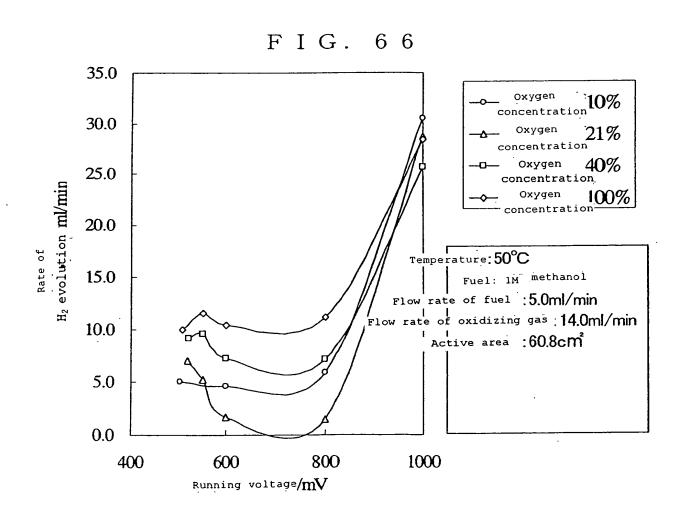


FIG. 67

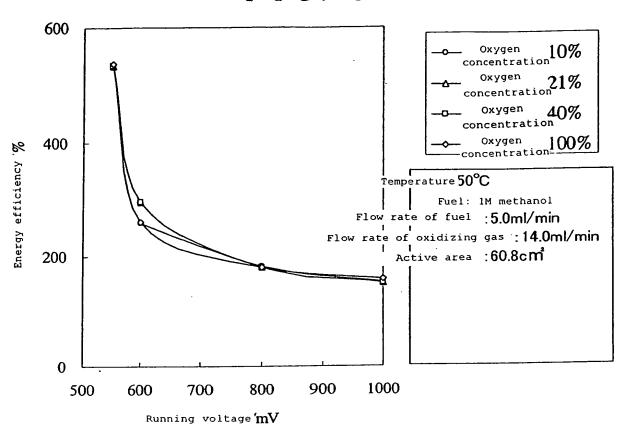


FIG. 68 50.0 Hydrogen peroxide 3.4ml/min) --- 30°C (Hydrogen 2.6ml/min) <u></u>4— 50°C(40.0 Hydrogen peroxide 5.5ml/min) ---- 70°C(: Hydrogen peroxide 5.3ml/min) Rate of H₂ evolution 'nl/min 30.0 -90°C (Fuel: 1M methanol 0.0Flow rate of fuel :5.0ml/min Oxidizing agent 1MH2O2 Flow rate of oxidizing agent 2.6~5.5ml/min Active area 60.8cm^2 0.0 0.0 0.04 0.06 0.08 0.10 0.00 0.02 Current density A/cm²

F I G. 69

